

Threatened species benefit from wetland restoration

Wetland restoration assisting in the national recovery of dwarf galaxias

Lauren Veale and Mark Bachmann, Nature Glenelg Trust

Wetland restoration in south-eastern Australia is proving beneficial for threatened species.

The dwarf galaxias (*Galaxiella pusilla*) is a tiny, slender, freshwater fish that grows to a maximum length of 40 millimetres. The nationally vulnerable species is endemic to south-eastern Australia, where it typically favours the shallow, densely vegetated habitats of freshwater wetlands – habitats that have been widely lost due to extensive artificial drainage for farming.

With funding from the the Nature Foundation SA Inc., surveys undertaken by ecologists at Nature Glenelg Trust revealed the partial recovery of previously identified populations and detected new populations of the species, after the breaking of the millennium drought. These surveys also highlighted the crucial role of wetland restoration in enabling natural aquatic species recovery. A prime example of

this is the restoration of Pick Swamp (previously drained and cleared for grazing) and the regulation of the artificial channel from the adjacent Piccaninnie Ponds, recreating additional shallow, seasonal habitat across the Piccaninnie Ponds Karst Wetlands Ramsar site which has greatly aided population recovery of dwarf galaxias.

Further sites where the species has benefitted from wetland restoration works undertaken in the coastal region of the South East of South Australia over recent years include private wetlands at Middle Point Swamp and public land at Bucks Lake Game Reserve. Most importantly, hydrological works of this nature provide a self-sustaining solution to a key threatening process and hence are a cost-effective mechanism for long-term threatened species recovery.



A male (top) and female (bottom) dwarf galaxias (*Galaxiella pusilla*) (© Copyright, Michael Hammer)

As readers of Issues 22 and 25 of *Wetlands Australia* magazine may have noted, Nature Glenelg Trust also has a long-term project underway in Long Swamp, over the border in south-western Victoria. In partnership with key community groups and with funding from the Victorian Government, the final stage (phase 3) of trial restoration works has just been completed.

The third phase trial structure, which consists of just under 7000 sandbags, was built with substantial community volunteer support and completed over nine days of works throughout the month of April in 2015. This weir is higher than the first phase of the trial (reported in Issue 25 of *Wetlands Australia*) and

as a result will influence a much larger area of wetland habitat upstream in Long Swamp. Ecologists at Nature Glenelg Trust will continue to evaluate the response of native flora and fauna in Long Swamp to the trial, including fish; noting that dwarf galaxias are expected to colonise new areas of the wetland in response to an increase in aquatic habitat availability and connectivity.

For further information, please contact
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www.natureglenelg.org.au.



Wetland habitat at Pick Swamp in June 2012 (right), recreated from farmland – shown here in May 2007 just before restoration works commenced (left) (© Copyright, Mark Bachmann)



*Dwarf galaxias (*Galaxiella pusilla*) habitat at Pick Swamp in 2014 (© Copyright, Lauren Veale)*



The phase 3 trial structure (foreground) has begun to regulate wetland levels in Long Swamp (background) by restricting flows from the Nobles Rocks outlet (© Copyright, Mark Bachmann)

Critically endangered and charismatic crayfish threatened by smooth operator

Western Australia Department of Fisheries

In a region known internationally for its wine and surf breaks, a smooth operator has invaded the Margaret River in south-west Western Australia and is threatening a local, charismatic crayfish.



Hairy marron (Cherax tenuimanus) captured from Margaret River in August 2014 as part of the survey work

(© Copyright, Rodney Duffy, Western Australia Department of Fisheries)

The critically endangered hairy marron (*Cherax tenuimanus*) is only found in the Margaret River and has been rapidly declining in numbers since the early 1980s, coinciding with the first identification of smooth marron (*Cherax cainii*) in the river system. There is now nowhere in the Margaret River catchment where hairy marron occur that smooth marron have not invaded.

The Western Australia Department of Fisheries (DoF), in conjunction with Cape to Cape Catchments Group (CCG) and South West Catchments Council (SWCC), have been busy implementing actions aimed at preventing the extinction of the species from this unique region. One of the major actions is an intensive effort aimed at physically fishing out and removing

smooth marron from hairy marron habitat. The first intensive year of this activity in 2014 resulted in the capture and removal of nearly all reproductively mature smooth marron from a test site. This resulted in an increase in the proportion of hairy marron in the population from less than 10 per cent to over 25 per cent. The success of this trial has resulted in the expansion of effort to the three sections of the river where hairy marron persist.

An established captive breeding program at the DoF owned Pemberton Freshwater Research Centre now contains more than 400 hairy marron. Some of these animals have been used to establish a display at Perth Zoo, to enhance awareness of the plight of this rare species. It is expected the others will be used to establish future hairy marron “ark” sites within the Margaret River catchment.

A new recovery plan for the species, funded by SWCC, has been written and is awaiting state and federal ratification. The recovery plan outlines the importance of the continued effort to remove smooth marron from habitats where hairy marron are present;

increasing numbers of hairy marron in the captive breeding program to allow restocking; and of finding suitable sites where restocking can occur with minimal risk of invasion from smooth marron. In addition, it highlights knowledge gaps and potential roadblocks to success.

Conservation work requires long-term commitment and a dedicated team to implement recovery actions. The hairy marron is lucky to have the support of DoF, CCG, SWCC and a dedicated team of hardworking volunteers. It is a long road to success, but great results are already being achieved.

This project is supported by SWCC with funding from the Australian Government’s National Landcare Programme, and the Government of Western Australia.

To follow progress of this activity, please subscribe to the Freshwater Guardian newsletter: <http://www.fish.wa.gov.au/Sustainability-and-Environment/Aquatic-Biodiversity/Freshwater-Biodiversity/Pages/Freshwater-Guardian.aspx>



Annique Harris, Western Australia Department of Fisheries, releases genetically tested and tagged hairy marron (Cherax tenuimanus) into a captive breeding pond at the Pemberton Freshwater Research Centre in May 2015 (© Copyright, Rodney Duffy, Western Australia Department of Fisheries)



The tufts of hair are buoyant, and give the hairy marron (Cherax tenuimanus) a furry appearance when submerged (© Copyright, Rodney Duffy, Western Australia Department of Fisheries)

Restoring connected habitat corridors benefits threatened wetland species in northern New South Wales

Laura White, WetlandCare Australia

The Northern Corridor Connections project is improving key habitat corridors on the New South Wales North Coast, achieving significant outcomes for wetland-dependant threatened species.

The project, which commenced in October 2014, is funded by North Coast Local Land Services under the National Landcare Program and the New South Wales Catchment Action Program. Project manager, WetlandCare Australia, has built an innovative partnership team delivering environmental outcomes across over 200 hectares of native vegetation and fauna habitat in the Tweed and Ballina areas. Working with other local natural resource management providers including Bushland Restoration Services, EnviTE, Jali Local Aboriginal Land Council and Reconeco Ecological Consultants, WetlandCare Australia has delivered a range of targeted vertebrate pest and environmental weed management activities that protect core habitat in key biodiversity corridors.

Through this project, on-ground restoration works were undertaken within a remnant of the critically endangered Littoral Rainforest and Coastal Vine Thickets of Eastern Australia ecological community adjacent to North Creek estuary in East Ballina. A pest management program was initiated at the site commencing with the installation of motion sensor cameras which have recorded the occurrence and behaviour of the vertebrate pest populations, especially the European Red Fox (*Vulpes vulpes*), and their impacts on the area.

In an unexpected and exciting twist, the cameras captured an image of the cryptic wetland bird, the black bittern (*Ixobrychus flavicollis*), which is listed as

vulnerable in New South Wales under the *Threatened Species Conservation Act (1995)*. This species of heron, which inhabits both freshwater and estuarine wetlands, was not previously known to occur at the site.

Disturbingly though, the cameras also captured an actively hunting fox population at the same location, including an image of an adult fox with freshly caught prey in its mouth. A large inhabited fox den was also located within the site. The fox is a listed threat to the black bittern, which often roost and feed on the ground.

Cage trapping and den fumigation activities were subsequently undertaken by vertebrate pest management specialists Reconeco at the North Creek site to target the troublesome fox population for the protection of the black bittern and other native fauna. Regenerators from WetlandCare Australia and Jali Local Aboriginal Land Council combined skills and knowledge to undertake weed management to further restore the habitat values of this important wetland.

Similar works undertaken within coastal heath and wetlands and riparian rainforests in the Ballina and Tweed areas under the project have contributed similar outcomes for threatened flora and fauna across the region.



*A motion sensor camera at North Creek near Ballina in Northern New South Wales captured this threatened black-bittern (*Ixobrychus flavicollis*), and later in the same location, a European Red Fox (*Vulpes vulpes*) with freshly caught prey* (© Copyright, WetlandCare Australia)



Before (top) and after (bottom) photos of bush regeneration works undertaken to restore fauna habitat at North Creek near Ballina in Northern New South Wales

(© Copyright, WetlandCare Australia)

Love me Tender

Nick McCristal, Corangamite Catchment Management Authority

Four Catchment Management Authorities have used single auction bids to encourage public and private landholders to protect coastal saltmarsh in Victoria.

The Corangamite Catchment Management Authority (CMA) received \$1 million in funding from the Australian and Victorian governments for a multi-regional project targeting coastal saltmarsh and associated vegetation. Coastal saltmarsh provides habitat for a number of nationally threatened species, including the critically endangered orange-bellied parrot (*Neophema chrysogaster*). Subtropical and temperate coastal saltmarsh is also listed as a vulnerable community under the federal *Environment Protection and Biodiversity Conservation Act (1999)*.

The project has been led by the Corangamite CMA, but covers four CMA regions along the Victorian coast. Coastal saltmarsh within Victoria has been impacted by a range of threatening processes and has decreased in extent significantly since European settlement. Key threats include uncontrolled stock access and associated trampling, weed infestation, altered hydrology from drainage and urban development.

The project encourages the conservation and restoration of coastal saltmarsh and associated vegetation by public and private landholders across the four CMAs. The project has been delivered utilising a market based instrument in the form of a single bid auction (or tender). Land managers interested in protecting coastal saltmarsh on their property are encouraged to register an expression of interest with the CMA. During a subsequent site assessment, vegetation is assessed using the Habitat Hectare methodology. Landholders submit a bid based on the management plan they receive following the site assessment. Project proposals are ranked in order of cost versus benefit. Successful participants are invited to enter into a five year contract with the CMA to undertake works to protect the coastal saltmarsh.

The project has been implemented across multiple tenures with varied levels of duty of care. As a result, this project has included design elements to manage this additional complexity. The EnSym environmental systems modelling platform, developed by the Victorian Department of Environment, Land, Water & Planning, has been utilised to develop management plans and assess multiple biophysical outcomes of proposed projects. This sophisticated software has enabled the project to deal with complex design and administrative issues with relative ease.

A summary of the results from the project include:

- 30 Expressions of Interest registered from 21 land managers
- Total of 1486 hectares of native vegetation eligible for funding
- 660 hectares of native vegetation under contract (five years) with management to include woody weed control, stock exclusion and pest animal control.
- 17 land managers (public and private) under contract at 18 sites
- 4.75 kilometres of new fencing installed for the protection of native vegetation.

For further information on the work of the Corangamite Catchment Management Authority, please visit:
<http://www.ccma.vic.gov.au/Home.aspx>



These before (top photo, July 2013) and after (bottom photo, May 2015) photos show the return of coastal saltmarsh to a Victorian property that received funding under the project (© Copyright, Jessie McMaster)

Successful industry offsetting: the NCIG Green and Golden Bell Frog Compensatory Habitat Program

Phil Reid, Newcastle Coal Infrastructure Group

The Newcastle Coal Infrastructure Group (NCIG) has established a program to offset the impacts to the green and golden bell frog (*Litoria aurea*) of the development of its coal terminal at Kooragang Island, near Newcastle, New South Wales.

The NCIG Green and Golden Bell Frog Compensatory Habitat Program was established to offset the impacts to the species and its habitat associated with the development of the Coal Terminal. The program ties together planning and cooperation with relevant regulatory authorities, extensive ecological surveys,

academic research, and consultation with land managers and stakeholders. The offset site for the species is located a short distance from the impact site, on Ash Island within the Hunter Wetlands National Park.



Green and golden bell frog in the NCIG compensatory habitat (© Copyright, Nathan Juchau, NCIG)



Construction of the NCIG green and golden bell frog habitat (© Copyright, Michael Godschalk, NCIG)



Aerial view of the NCIG green and golden bell frog habitat, Ash Island, Hunter Wetlands National Park

(© Copyright, Roger Sherack, Skycam Photography).

The threatened *Litoria aurea* is a large mobile native frog species that has disappeared from over 95% of its previous habitat. Historically, there have been difficulties in re-introducing the species, as it is particularly sensitive to key threatening processes. These include habitat loss, introduced predatory species, water pollution and disease caused by an introduced water-borne fungus, known as chytrid fungus. Previous attempts in NSW to establish a *Litoria aurea* population in constructed habitat have failed, not persisted after one breeding event or required intensive management and habitat development.

The NCIG Project has transformed 78 hectares of disused former pastoral leases (gazetted since 2006 as national park) into *Litoria aurea* habitat, including 18 ponds, wetland vegetation, basking and overwintering habitat. The work was completed in November 2014, and the project is considered to be the largest single-species conservation project in the southern hemisphere.

The NCIG program has been able to find ways not only to successfully introduce a captive-bred population to the constructed habitat, but also to

achieve breeding in the habitat, far sooner than expected. This is due to multiple reasons, including funding of extensive research into the species in areas such as behavioural ecology and habitat preference. Research has been conducted both at laboratory scale at the University of Newcastle and in a specially designed “Trial Site” in the Hunter Wetlands National Park.

The breeding achieved in the habitat in January and February 2015 is considered by all stakeholders to be a huge achievement so early in the program. While there is still no estimate on the number of tadpoles produced from the combined breeding across numerous ponds, one clutch of tadpoles was estimated to be well in excess of 2500 individuals.

The interim success of this project provides credibility to the overall principles of offsetting, developed by government and practised by industry.

Learn more about the project at:

<http://www.ncig.com.au/SustainableDevelopment/Environment/tabid/143/Default.aspx>

Restoring swamp sclerophyll forest for koalas in the Hunter Estuary in New South Wales

Louise Duff, WetlandCare Australia

When you think of koalas, do swamps spring to mind? Swamp mahogany trees found in wetlands are a preferred food species for this much-loved threatened species.

The Hunter Region Botanic Gardens is a natural attraction that showcases native and exotic flora in theme gardens managed entirely by volunteers. The site is owned by Hunter Water. One of many natural assets at the Gardens is the Wet Sclerophyll Forest that borders a freshwater wetland. The forest is listed as an Endangered Ecological Community under the New South Wales *Threatened Species Conservation Act* (1995). Towering swamp mahoganies (*Eucalyptus robusta*) are abundant in the forest.

Swamp mahogany is one of three preferred food trees for the koala (*Phascolarctos cinereus*) in Port Stephens. Smooth-barked apple (*Angophora costata*) is also present in the surrounding Coastal Open Woodland. Many koala sightings at the gardens have been recorded on the Atlas of Living Australia. As a result, the Swamp Sclerophyll Forest is covered by State Environmental Planning Policy (SEPP) number 44: Koala Habitat Protection.

WetlandCare Australia (WCA) received funding from the New South Wales Environmental Trust to rehabilitate 40 hectares of koala habitat at the Gardens, with additional support from the Great Eastern Ranges Initiative's Stepping Stones project, and funding from the Australian Government. The

two year project ran from July 2013 to June 2015. A dense blanket of lantana (*Lantana camara*) covered the forest, inhibiting succession of swamp mahogany and other winter forage species.

Under the project, WCA undertook a native vegetation survey, weed density survey and prepared a lantana control plan for the site. We engaged bush regeneration crews, including two Indigenous workers trained through our Newcastle Wetland Connections project, which is funded by the Australian Government. The works were monitored with photo points and vegetation surveys, showing a dramatic increase in juvenile koala forage trees, an increase in the abundance of ground orchids and a 90 per cent reduction in lantana at the project site.

WCA also undertook a baseline and follow up koala survey with the assistance of volunteers. We found no koala scats during the baseline survey and were excited to find numerous scats in the following survey. While we cannot demonstrate a link between our project works and the scats, it was good to confirm koalas still use the site. We also produced a poster on Endangered Fauna at the Gardens, and ran a habitat hike for volunteers.

WCA maintains long-term relationships with project sites to sustain outcomes beyond the life of the project. On this occasion, we have booked two Green Army teams to continue follow-up regeneration of the site, ensuring the Hunter Region Botanic Gardens will continue to provide forage and shelter for this iconic threatened species.

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Volunteers of all ages are important for wetland restoration and monitoring activities (© Copyright, WetlandCare Australia)

Using mature vegetation to create ready-made wetland habitat in Western Australia

Blackwood Basin Group

Now in its second year, the Blackwood Basin Group's (BBG) *Priority Bittern and Waterbird Biodiversity Enhancement Project* has both success and learnings to share.

The Project aims to create a wetland haven from historic mining dams in Greenbushes in south-west Western Australia, to provide vital habitat for endangered waterbird and migratory species. In partnership with Talison Lithium Ltd and supported by the Western Australia Department of Parks and Wildlife, the project is run by the Blackwood Basin Group with funding from the Australian Government.

The focus species for the rehabilitation are the endangered Australasian bittern (*Botaurus poiciloptilus*), little bittern (*Ixobrychus minutus*), and black bittern (*Ixobrychus flavicollis*). These species require tall, dense and reedy habitat in emergent freshwater, hence revegetation forms a major part of the project along with large-scale feral animal and weed control, dam modification, flora and fauna surveys and community engagement activities.

The BBG has trialed a number of methods to revegetate seasonally inundated areas for waterbird habitat, some with more success than others. The jointed twig rush (*Baumea articulata*) is the primary species being used, with mature clumps being divided from a large reed bed source nearby using both manual and machinery methods.

In wetlands with variable water levels, using machinery to relocate mature clumps offers many advantages over manual handling methods or seedlings. We found that once the winter rains arrive, water levels increase rapidly to inundate approximately three hectares of

beds that are exposed during low water level. This is unfavourable for seedlings as they can easily be flooded and drowned if planted before the rains, or left exposed and vulnerable to drying out and predation by herbivores in the summer. Manually planting clumps led to damage of the stems during the unloading stage which resulted in some being flooded and dying completely, while in others growth was hindered as new shoots emerged only once water levels reduced.

Using expert and precise excavator drivers to remove, load, unload, and plant mature clumps reduced handling and subsequent damage, and allowed for larger clumps to be planted. These are much less likely to be predated by herbivores and, with less damage and more of the stems standing upright, are unlikely to drown. A technique of tying bunches at the loading stage also assisted more clumps to stand upright.

Using mature vegetative divisions with machinery-assisted planting keeps the root system intact, complete with a microbial ecosystem that will allow the plant to thrive, grow and provide a ready-made wetland for the protection of threatened waterbird species.

For more information on this project, please go to the website www.blackwoodbasingroup.com.au



*Trucks are used to transport mature clumps of jointed twig rush (*Baumea articulata*), and heavy machinery is used to remove, load, unload, and plant the clumps to create a ready-made wetland habitat* (© Copyright, Blackwood Basin Group)



Wetlands are being restored in Western Australia using mature vegetative divisions to provide habitat for a variety of threatened waterbirds (© Copyright, Blackwood Basin Group)